DOCUMENT RESUME

ED 245 643 HE 017 410

AUTHOR Shaeffer, James M.; Menges, Robert J.
TITLE A Comprehensive Model of In-Class and Out-Of-Class Learning in Higher Education.
PUB DATE Apr 84
NOTE 18p.; Paper presented at the Annual Meeting of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Students; Higher Education; *Learning; *Models; *Student Behavior; *Teacher Behavior; *Time Factors (Learning); Time on Task

ABSTRACT

A model of in-class and out-of-class learning in higher education is discussed, and the literature related to out-of-class factors and time factors in teaching-learning is reviewed. Three related models of school learning are briefly reviewed. John Carroll's model (1963) proposes that the degree of student learning is determined by the time needed for learning and time spent in learning. A second model by B. S. Bloom (1976) incorporates mastery learning and conceives of the teaching-learning process as consisting of student background characteristics, instruction, and student outcomes. Harnischfeger and Wiley's model (1975, 1977) examines the interaction of student/teacher characteristics, along with curriculum and instructional factors. The model of in-class and out-of-class learning in higher education draws heavily upon the three models. Outcomes of this model are student achievement and student affective outcomes. Student variables that affect the teaching-learning process are the student's task aptitude and general aptitude. Teacher variables include the teacher's prior experiences relevant to the course and time spent on course preparation. Instructional and contextual variables are also identified. Diagrams illustrating the models are included. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED245643

A Comprehensive Model of In-Class and Out-of-Class Learning in Higher Education**

James M. Shaeffer and Robert J. Menges

Northwestern University

This paper briefly reviews three models of school learning and then presents our own model of in-class and out-of-class learning in higher education and some related research.

Models of School Learning

Carroll's Model

John Carroll (1963) introduced the first model of school learning. According to Carroll (see figure 1) the degree of student learning is determined by the time needed for learning and time spent in learning.

The time students need for learning is affected by their opportunity to learn and the quality of instruction students receive. Determinants of time spent in learning are students' aptitude, ability, and perseverance.

A major contribution of Carroll's model is the recognition of time as an important variable in the teaching-learning process.

**Paper presented at the American Educational Research Association, April, 1984

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

James M. Shaeffer

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

HE 017 410

Bloom's Model

The second model considered here is Bloom's (1976) model. Reflected in Bloom's model is the instructional approach called mastery learning.

Bloom (see figure 2) conceives of the teaching-learning process as consisting of student background characteristics, instruction, and student outcomes. Student characteristics that affect learning are cognitive entry behaviors and affective entry behaviors.

Quality of instruction students receive also determines the degree of student learning. Bloom specifies four components in quality of instruction: 1) cues, 2) reinforcement, 3) participation, 4) feedback/correctives.

Student outcomes for Bloom are student's level of achievement, rate of learning, and affective outcomes.

Two important contributions of Bloom's model are inclusion of affective variables and their impact on student learning and examination of the serial nature of learning, i.e., how previously learned tasks affect the learning of future tasks.

Harnischfeger and Wiley's Model

The most recent model of school learning is presented by Harnischfeger and Wiley (1975, 1977). Their model (see figure 3) examines the interaction of student/teacher characteristics, along with curriculum and instructional factors. Like Carroll's model, their outcome variable is pupil achievement which is directly determined by pupil

pursuits. Pupil pursuits are, in turn, determined by teacher's background, pupil's background, and curriculum and institutional factors.

This model has several merits. It examines the interaction of student, teacher, curricular, and institutional variables and asserts that student background characteristics should influence teacher activities. Due to the comprehensive nature of this model, it is particularly useful for policy decision making (Leinhart, 1980).

Model of Supervised/Unsupervised Learning in Higher Education

The model of in-class and out-of-class learning in higher education draws heavily upon the three previous models and utilizes concepts from each which are most pertinent to higher education.

Outcomes of this model (see figure 4) are student achievement and student affective outcomes. Both are directly affected by total content comprehended by the student.

This latter variable is determined by the amount of time a student spends in unsupervised and supervised active learning.

Student Variables

Student variables that impact on the teaching-learning process are the students' task aptitude and general aptitude. In higher education students' general aptitude is often measured with SAT and ACT scores, and task aptitude is

reflected in the students' prior learnings, e.g., other college courses or high school experiences.

Student learning is also influenced by the students' motivation level. That is, assuming the greater the student's motivation the more time the student will spend actively learning. Student motivation includes an intrinsic motivation for learning and a course specific motivation which is influenced by the student's expectations of the course and instructor.

Variables that impact on the student's out-of-class study time are: the time a student has available for studying--considered here are other in-class and out-of-class obligations; and the amount of time the student allows for studying outside of class.

Teacher Variables

Teacher variables that impact on the teaching-learning process include: the teacher's prior experiences relevant to the course e.g., research interests; and time spent on course preparation, assuming that more time spent i preparation results in better in-class performance.

Instructional Variables

Instructional variables that impact on the teaching-learning process are: individual advising time--the time out-of-class that students and teachers discuss class content, e.g., offices hours; the quality of the teachers in class presentation-- and the teacher's subtask sequencing and pacing of the course i.e., the sequencing of reading assignments, quizes, and exams. Another instructional

variable that affects learning in higher education is time allocated to content by teacher while in-class, that is, the amount of time the teacher spends discussing course-specific content as compared to other topics.

Contextual Variables

Contextual variables that influence the teaching-learning process in higher education are the content area of the class which may be related to class size. Both of these variables, in turn, influence the instructional method used in the classroom.

Emphasizing Out-of-Class Learning Time

A major difference between this model of learning and others is the inclusion of out-of-class learning time. In higher education students spend the largest share of their learning time out of class. While highlighting out-of-class learning time, this model also recognizes the impact of in-class learning time on student achievement in higher education.

Literature Review

We have examined literature associated with the cells in this model and have found that a great deal of research on the teaching-learning process in higher education has concentrated on the instructional methods used by faculty. This paper reviews the literature related to out-of-class factors and time factors.

Two student variables of interest are the students time available for studying and time students allow for studying.

Time Available for Studying

Due to differing class loads and out-of-class obligations, some students have more time available for studying than others. Two groups of students with obviously different amounts of time available for studying are working and nonworking students. Research (Wagstaff and Mahmoudi, 1976; Hay and Lindsay, 1969) indicates working students often have lower achievement than nonworking students which may be due to working students limited study time.

One study (Wagstaff and Mahmoudi, 1976) tested this notion by comparing the amount of time working and nonworking lower division engineering and science majors spent studying. They found that both groups of students allowed approximately the same amount of time for studying but working students had lower achievement.

An explanation for working students lower achievement is that they are forced to study at "odd" hours which hinders their comprehension of course material. This could be tested by asking students to keep on-going records of when they study.

One can speculate that students with more time available have the opportunity to study more. Which students take advantage of this extra time is unclear.

Time Allowed for Studying

It is hypothesized that the more time students allow for studying the higher their achievement.

In a large sample analysis using the "High School and Beyond" data, Keith (1982) found the number of hours spent on homework contributed significantly to students' GPA. The

five studies in higher education we reviewed replicate this positive relationship between length of reported study time and student achievement. However, the relationship is usually small and statistically insignificant.

For example, one study (Tichenor, 1977) examined the amount of time students spent studying and its impact on student achievement and found no significant differences between heavy and light studiers.

Another study (Wagstaff and Mahmoudi, 1976) examined the impact of student's study time, time spent in employment, and study habits on student GPA. The most powerful predictor of GPA was a work completion question which asked students whether they finished readings and problems before exams. Estimated hours of study per week were positively, but not significantly, related to students' GPA.

Total Time in Supervised Active Learning

Two instructional variables associated with time in the teaching-learning process are students total time in supervised active learning and individual advising time. Supervised active learning as measured in elementary and secondary settings is documented through direct observation. One study was located that examined this variable in higher education. Johnson and Butts (1983) used direct observation in a junior college classroom and found that student achievement was related to in-class behavior. They concluded students displaying attentive behaviors in class had higher achievement.

Individual Student Advising Time

Individual advising time explores the importance of student/faculty out-of-class contact. Three studies (Theophilides and Terenzini, 1981; Gaff, 1973; Pascarella, 1980) suggested that student/faculty informal contact influences students' perceptions of teachers and subject matter.

According to one study (Theophilides and Terenzini, 1980), students rate more positively those teachers with whom they have more contact. Another study (Gaff 1973) found that both student and faculty feel the most influencial teachers are those who have more interaction with students outside of class.

A review of the literature (Pascarella, 1980) concluded that student/faculty contact positively influenced students' educational aspirations, general satisfaction with college, and students' persistence.

Teacher's Prior Experiences Relevant to Course

An instructor variable important for the teaching-learning process is a teacher's prior experience. One important prior experience is the faculty member's experience in research. The impact of research on teaching may vary from highly positive to highly negative. Nine studies (Frumkin and Howell, 1954; Maslow and Zimmerman, 1956; Voek, 1962; Stallings and Singhal, 1970; Aleamoni and Yimer, 1973; Hoyt and Spangler, 1976; Dent and Lewis, 1976; Centra, 1983) indicated a small positive relationship between research activity and teaching.

A recent study by Centra (1983) examined over 3,000 professors to determine if there was "spill over" from a professor's research to their class performance. He found a small positive relationship between the number of articles published and student ratings. This was especially true in the social sciences but even there it was a modest relationship.

Most studies used student and colleague ratings as measures of teacher effectiveness, but several different measures of reseach effectiveness were used: e.g., number of publications, weighted publication indices, self-reports of hours spent in research, and department heads' ranking of research activity. Similar results were obtained with all of these measures, i.e., positive but insignificant relationship between teaching and research activity. This result was also consistent across types of institutions.

Testing the Model

Although this paper is primarily a presentation of the model, we mention in closing one study based on the model. The research tests the relationship of several cells in the model of in-class and out-of-class learning, in particular examining the effect of student out-of-class study time on student achievement in introductory college economics.

Daily student reports provided information about the amount of time students spend studying This questionnaire asks students to record not only the total amount of time they study on a particular day but also when they study; e.g., morning, afternoon, or evening.

Students also provided background information concerning whether they were employed, how much time they spent on the job, how many hours in a week they spent on other activities besides studying, and the total amount of time they had available for studying.

Preliminary results indicate that students often delay studying until the last few days before an exam. This appears to be true for both high achievement and low achievement students. Other results, hopefully more subtle ones, await further analysis.

References

Aleamoni, L. M., & Yimer, M. An investigation of the relationship between colleagues rating, student rating, research productivity, and academic rank in rating instructional effectiveness. Journal of Educational Psychology, 1973, 64, 274-77.

Bloom, B. S. Human characteristics and school learning. N. Y.: McGraw-Hill, 1976.

Carroll, J. B. A model of school learning. Teachers College Record, 1963, 64, 723-33.

Centra, J. A. Research productivity and teaching effectiveness. Reseach in Higher Education, 1983, 18,379-89.

Dent, P. L., & Lewis, D. J. The relationship between teaching effectiveness and measures of research quality. Educational Research Quarterly, 1976, 1, 3-16.

Fumkin, R. M., & Howell, W. H. Effective college teaching: A preliminary causal analysis. Journal of Educational Research, 1954, 47, 683-93.

Gaff, J. G. Making a difference: The impacts of faculty. Journal of Higher Education, 1973, 45, 605-22.

Harnischfeger, A., & wiley, D. E. Conceptual issues in models of school learning. Curriculum Studies, 1978, 10, 215-31.

Harnischfeger, A., & Wiley, D. E. Conceptual issues in models of school learning. Studies of Educative Processes, No. 10, Chicago, IL: ML-GROUP, CEMREL, 1977.

Hay, J. E., & Lindsey, C. A. The working student: How does he achieve? Journal of College Student Personell, 1969, 10, 109-14.

Hoyt, D. P., & Spangler, R. K. Faculty research involvement and instructional outcomes. Research in Higher Education, 1976, 4, 113-22.

Johnson, T. F., & Butts, D. P. The relationship of among college science student achievement engaged time, and personal characteristics. Journal of Research in Science Teaching, 1983, 20, 357-66.

Keith, T. Z. Time spent on homework and high school grades: A large-sample path analysis. Journal of Educational Psychology, 1982, 74, 248-53.

Leinhart, G. Modeling and measuring educational treatment in evaluation. Review of Educational Research, 1980, 50,

393-420.

Maslow, A. H., & Zimmerman, W. College teaching ability, scholarly activity, and personality. Journal of Educational Psychology, 1956, 47, 185-89.

Pascarella, E. T. Student-faculty informal contact and college outcomes. Review of Educational Research, 1980, 50, 545-95.

Stallings, W. M., & Singhal, S. Some observations on the relationship between research productivity and student evaluations of courses and teaching. American Sociologist, 1970, 5, 141-43.

Theophiides, C. & Terenzini, P. The relation between nonclassroom contact with faclty and students' perceptions of instructional quality. Research in Higher Education, 1981, 15, 255-69.

Tichenor, J. L. Self-monitoring and self-reinforcement of studying by college students. Psychological Reports, 1977, 40 , 103-08.

Voeks, V. W. Publications and teaching effectiveness. Journal of Higher Education, 1962, 33, 212-218.

Wagstaff, R., & Mahmoudi, H. Relation of study behaviors and employment to academic performance. Psychological Reports, 1976, 38, 380-82.

Figure 1. Model of School Learning (Carroll) from Harnischfeger and Wiley (1977)

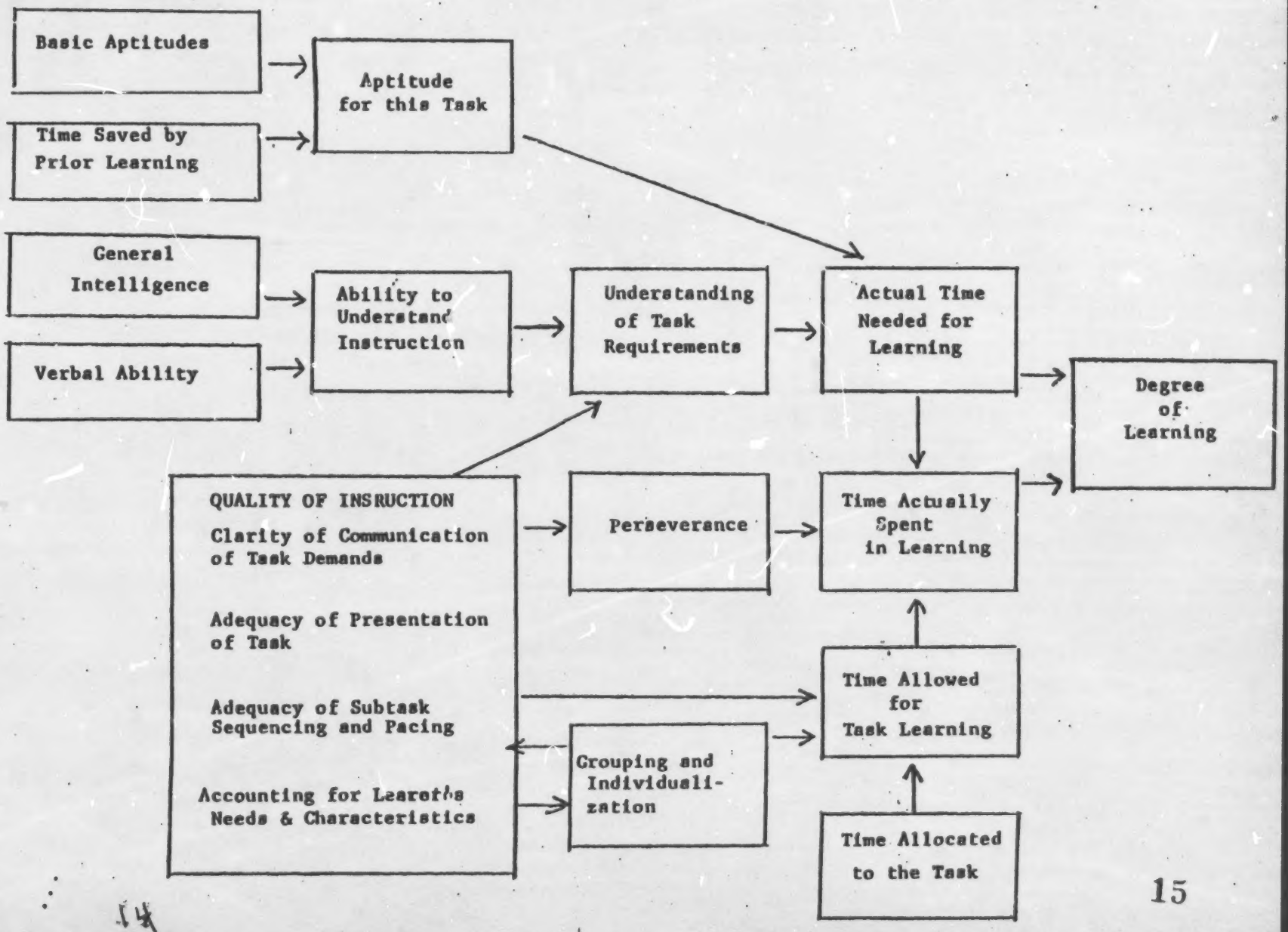
Basic Aptitudes
Aptitude for this Task
Time Saved by Prior Learning
General Intelligence
Ability to Understand Instruction
Verbal Ability
Understanding of Task Requirements
Actual Time Needed for Learning
Degree of Learning
QUALITY OF INSTRUCTION
Clarity of Communication of Task Demands
Adequacy of Presentation of Task
Adequacy of Subtask Sequencing and Pacing
Accounting for Learners Needs & Characteristics
Perseverance
Time Actually Spent in Learning
Time Allowed for Task Learning
Grouping and Individualization
Time Allocated to the Task

Figure 2. Model of School Learning (Bloom) From Harnischfeger and Wiley (1977)

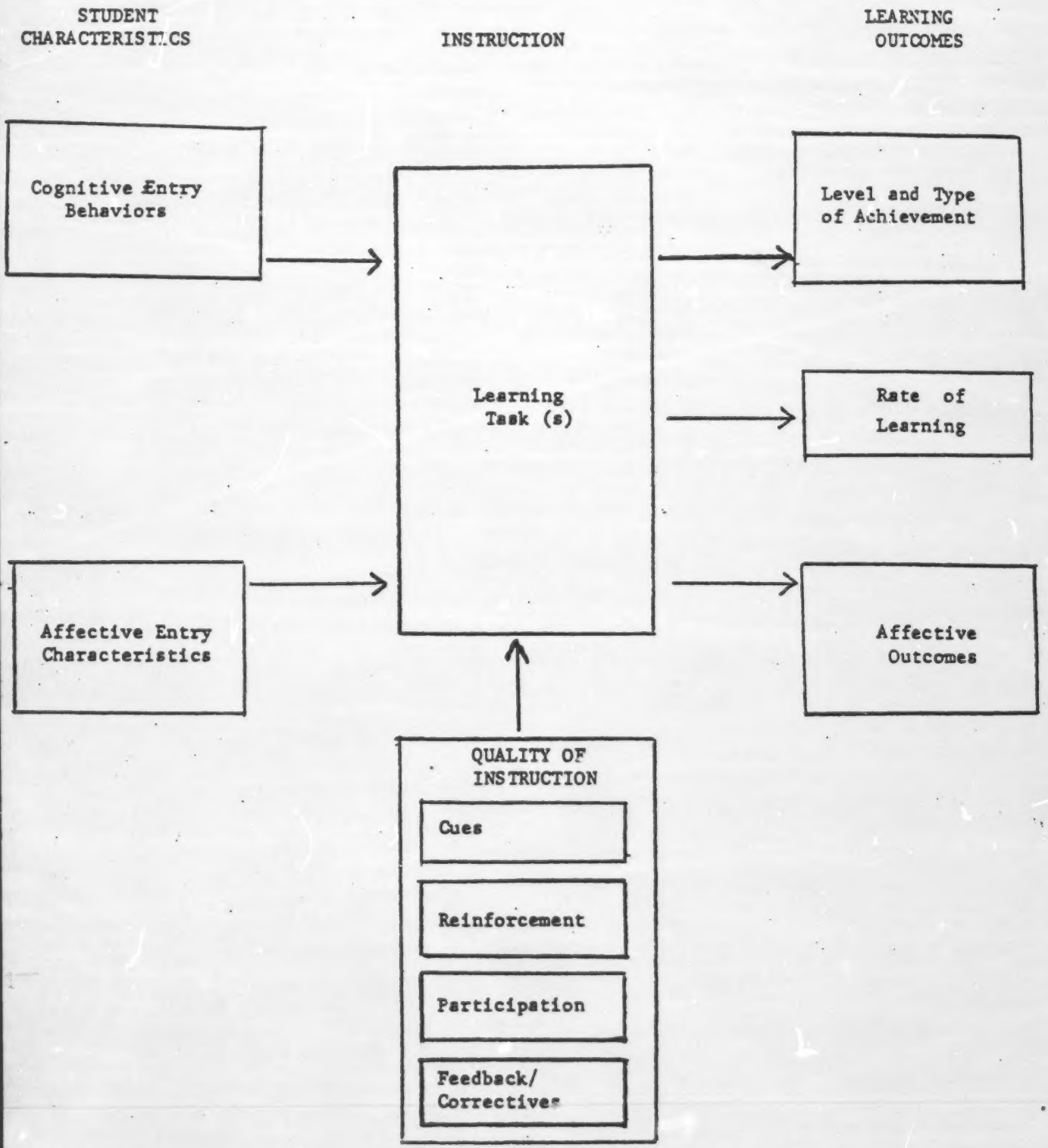

Figure 3. Determinants of Pupil Achievement (Harnischfeger and Wiley)
From Harnischfeger and Wiley (1977).

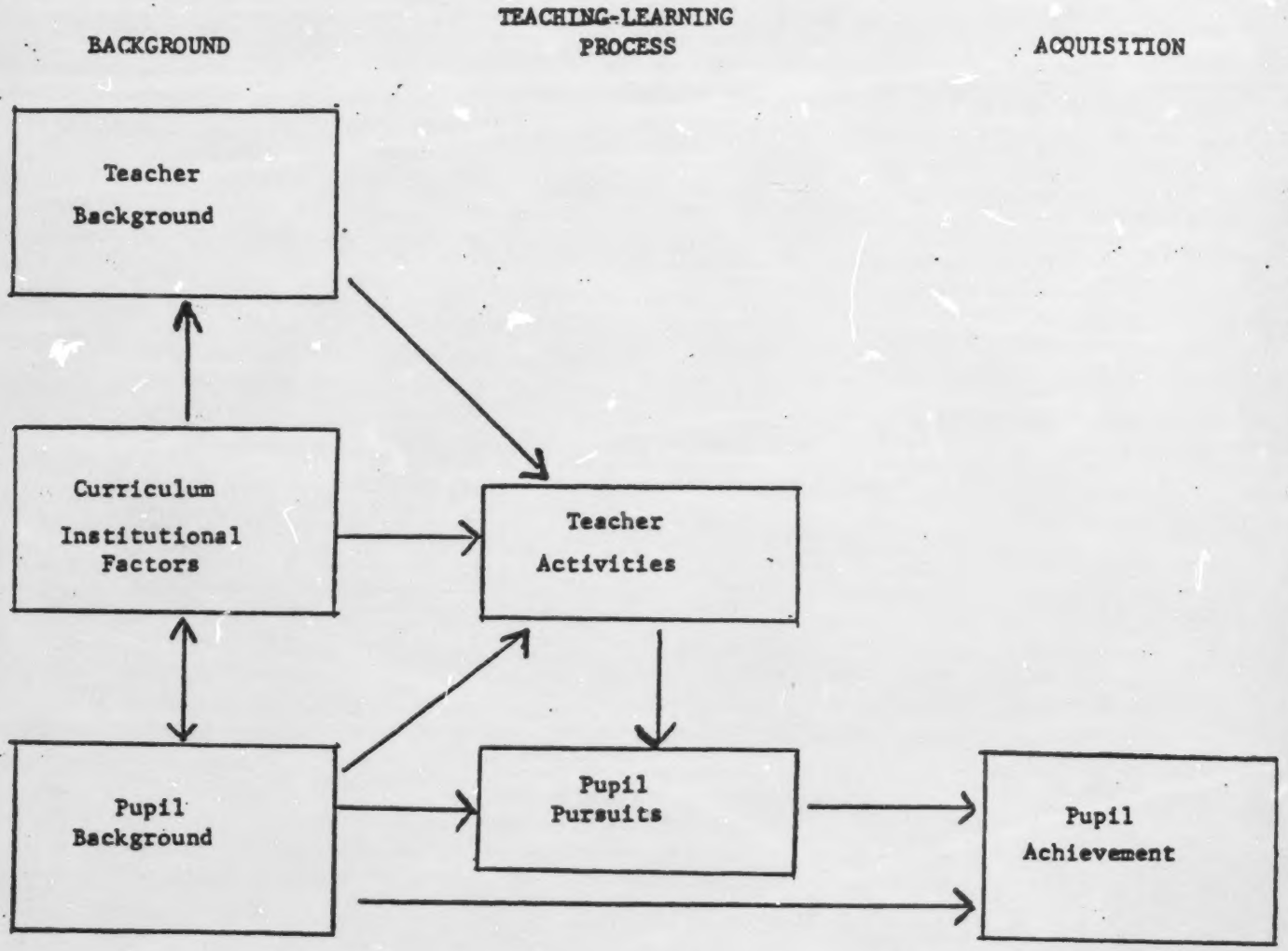

Table 4. Model of learning in higher education (Shaeffer)